

## Lesions in Male Rats

A-25

TABLE A3

Statistical Analysis of Primary Neoplasms in Male Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Pancreatic Islets: Adenoma or Carcinoma</b>			
Overall rates	2/47 (4%)	0/41 (0%)	2/43 (5%)
Adjusted rates	25.0%	0.0%	9.9%
Terminal rates	2/8 (25%)	0/13 (0%)	1/13 (8%)
First incidence (days)	799 (1)	—	617
Life table tests	P=0.650	P=0.135N	P=0.560N
Logistic regression tests	P=0.544	P=0.135N	P=0.683
Cochran-Armitage test	P=0.531		
Fisher exact test		P=0.282N	P=0.657
<b>Pituitary Gland (Pars Distalis): Adenoma</b>			
Overall rates	12/47 (26%)	11/50 (22%)	10/49 (20%)
Adjusted rates	53.6%	42.8%	42.1%
Terminal rates	3/9 (33%)	3/14 (21%)	4/16 (25%)
First incidence (days)	568	558	697
Life table tests	P=0.174N	P=0.334N	P=0.160N
Logistic regression tests	P=0.307N	P=0.419N	P=0.324N
Cochran-Armitage test	P=0.344N		
Fisher exact test		P=0.432N	P=0.362N
<b>Pituitary Gland (Pars Distalis): Adenoma or Carcinoma</b>			
Overall rates	12/47 (26%)	12/50 (24%)	10/49 (20%)
Adjusted rates	53.6%	45.8%	42.1%
Terminal rates	3/9 (33%)	3/14 (21%)	4/16 (25%)
First incidence (days)	568	558	697
Life table tests	P=0.159N	P=0.411N	P=0.160N
Logistic regression tests	P=0.287N	P=0.509N	P=0.324N
Cochran-Armitage test	P=0.325N		
Fisher exact test		P=0.524N	P=0.362N
<b>Preputial Gland: Carcinoma</b>			
Overall rates	1/48 (2%)	6/49 (12%)	1/48 (2%)
Adjusted rates	2.3%	22.5%	2.5%
Terminal rates	0/9 (0%)	1/14 (7%)	0/16 (0%)
First incidence (days)	586	527	628
Life table tests	P=0.361N	P=0.090	P=0.753N
Logistic regression tests	P=0.440N	P=0.058	P=0.750
Cochran-Armitage test	P=0.425N		
Fisher exact test		P=0.059	P=0.753N
<b>Preputial Gland: Adenoma or Carcinoma</b>			
Overall rates	2/48 (4%)	7/49 (14%)	2/48 (4%)
Adjusted rates	4.4%	28.5%	8.6%
Terminal rates	0/9 (0%)	2/14 (14%)	1/16 (6%)
First incidence (days)	429	527	628
Life table tests	P=0.331N	P=0.134	P=0.632N
Logistic regression tests	P=0.454N	P=0.078	P=0.673
Cochran-Armitage test	P=0.436N		
Fisher exact test		P=0.084	P=0.692N

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Talc, NTP TR 421

**TABLE A3**  
**Statistical Analysis of Primary Neoplasms in Male Rats in the Lifetime Inhalation Study of Talc (continued)**

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Skin: Keratoacanthoma or Squamous Cell Carcinoma</b>			
Overall rates	0/49 (0%)	3/50 (6%)	2/50 (4%)
Adjusted rates	0.0%	13.5%	6.6%
Terminal rates	0/9 (0%)	1/14 (7%)	0/16 (0%)
First incidence (days)	-	663	594
Life table tests	P=0.414	P=0.161	P=0.331
Logistic regression tests	P=0.323	P=0.128	P=0.239
Cochran-Armitage test	P=0.319		
Fisher exact test		P=0.125	P=0.253
<b>Testes: Adenoma</b>			
Overall rates	31/49 (63%)	39/50 (78%)	36/50 (72%)
Adjusted rates	100.0%	100.0%	97.0%
Terminal rates	9/9 (100%)	14/14 (100%)	15/16 (94%)
First incidence (days)	551	544	609
Life table tests	P=0.198N	P=0.524	P=0.245N
Logistic regression tests	P=0.333	P=0.056	P=0.268
Cochran-Armitage test	P=0.295		
Fisher exact test		P=0.082	P=0.238
<b>Thyroid Gland (C-cell): Adenoma</b>			
Overall rates	3/45 (7%)	4/46 (9%)	3/46 (7%)
Adjusted rates	24.5%	28.6%	14.5%
Terminal rates	2/9 (22%)	4/14 (29%)	2/16 (13%)
First incidence (days)	682	799 (T)	614
Life table tests	P=0.348N	P=0.620N	P=0.476N
Logistic regression tests	P=0.511N	P=0.641	P=0.625N
Cochran-Armitage test	P=0.560N		
Fisher exact test		P=0.512	P=0.651N
<b>Thyroid Gland (C-cell): Adenoma or Carcinoma</b>			
Overall rates	3/45 (7%)	5/46 (11%)	3/46 (7%)
Adjusted rates	24.5%	33.0%	14.5%
Terminal rates	2/9 (22%)	4/14 (29%)	2/16 (13%)
First incidence (days)	682	787	614
Life table tests	P=0.296N	P=0.568	P=0.476N
Logistic regression tests	P=0.467N	P=0.502	P=0.625N
Cochran-Armitage test	P=0.523N		
Fisher exact test		P=0.369	P=0.651N
<b>All Organs: Mononuclear Cell Leukemia</b>			
Overall rates	24/49 (49%)	21/50 (42%)	23/50 (46%)
Adjusted rates	70.3%	59.9%	62.5%
Terminal rates	3/9 (33%)	4/14 (29%)	6/16 (38%)
First incidence (days)	334	529	492
Life table tests	P=0.298N	P=0.232N	P=0.269N
Logistic regression tests	P=0.501N	P=0.317N	P=0.479N
Cochran-Armitage test	P=0.486N		
Fisher exact test		P=0.310N	P=0.462N

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## Lesions in Male Rats

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TABLE A3

Statistical Analysis of Primary Neoplasms in Male Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>All Organs: Benign Tumors</b>			
Overall rates	42/49 (86%)	45/50 (90%)	45/50 (90%)
Adjusted rates	100.0%	100.0%	100.0%
Terminal rates	9/9 (100%)	14/14 (100%)	16/16 (100%)
First incidence (days)	429	544	594
Life table tests	P=0.161N	P=0.314N	P=0.153N
Logistic regression tests	P=0.463	P=0.430	P=0.480
Cochran-Armitage test	P=0.353		
Fisher exact test		P=0.365	P=0.365
<b>All Organs: Malignant Tumors</b>			
Overall rates	34/49 (69%)	34/50 (68%)	34/50 (68%)
Adjusted rates	88.4%	80.9%	80.0%
Terminal rates	6/9 (67%)	7/14 (50%)	9/16 (56%)
First incidence (days)	334	527	248
Life table tests	P=0.222N	P=0.308N	P=0.216N
Logistic regression tests	P=0.534N	P=0.539N	P=0.571N
Cochran-Armitage test	P=0.505N		
Fisher exact test		P=0.527N	P=0.527N
<b>All Organs: Benign or Malignant Tumors</b>			
Overall rates	48/49 (98%)	49/50 (98%)	50/50 (100%)
Adjusted rates	100.0%	100.0%	100.0%
Terminal rates	9/9 (100%)	14/14 (100%)	16/16 (100%)
First incidence (days)	334	527	248
Life table tests	P=0.154N	P=0.241N	P=0.139N
Logistic regression tests	P=0.337	P=0.771	P=0.506
Cochran-Armitage test	P=0.348		
Fisher exact test		P=0.747	P=0.495

## (T) Terminal sacrifice

<sup>a</sup> Number of tumor-bearing animals/number of animals examined. Denominator is number of animals examined microscopically for adrenal gland, bone marrow, brain, clitoral gland, epididymis, gallbladder (mouse), heart, kidney, larynx, liver, lung, nose, ovary, pancreas, parathyroid gland, pituitary gland, preputial gland, prostate gland, salivary gland, spleen, testes, thyroid gland, and urinary bladder; for other tissues, denominator is number of animals necropsied.

<sup>b</sup> Kaplan-Meier estimated tumor incidence at the end of the study after adjustment for intercurrent mortality

<sup>c</sup> Observed incidence at terminal kill

<sup>d</sup> Beneath the control incidence are the P values associated with the trend test. Beneath the dosed group incidence are the P values corresponding to pairwise comparisons between the controls and that dosed group. The life table analysis regards tumors in animals dying prior to terminal kill as being (directly or indirectly) the cause of death. The logistic regression tests regard these lesions as nonfatal. The Cochran-Armitage and Fisher exact tests compare directly the overall incidence rates. For all tests, a negative trend or a lower incidence in a dose group is indicated by N.

<sup>e</sup> Not applicable; no tumors in animal group

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A-28

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TABLE A4

Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the Lifetime Inhalation Study of Talc<sup>a</sup>

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Disposition Summary</b>			
Animals initially in study	50	50	50
Early deaths			
Moribund	23	19	20
Natural deaths	18	17	14
Survivors			
Died last week of study	1	2	3
Terminal sacrifice	8	12	13
Animals examined microscopically	49	50	50
<b>Alimentary System</b>			
Esophagus	(49)	(50)	(49)
Inflammation			1 (2%)
Intestine large, cecum	(42)	(38)	(37)
Hemorrhage		1 (3%)	
Inflammation	9 (21%)	2 (5%)	5 (14%)
Parasite metazoan	3 (7%)	4 (11%)	4 (11%)
Ulcer	1 (2%)		
Intestine large, colon	(43)	(43)	(46)
Hyperplasia, lymphoid	1 (2%)		
Inflammation	1 (2%)		1 (2%)
Mineralization			1 (2%)
Parasite metazoan	2 (5%)	1 (2%)	1 (2%)
Intestine large, rectum	(38)	(41)	(34)
Inflammation	6 (16%)	1 (2%)	1 (3%)
Metaplasia, squamous, focal			1 (3%)
Parasite metazoan		2 (5%)	
Intestine small, duodenum	(48)	(44)	(46)
Inflammation			1 (2%)
Mineralization	1 (2%)		
Necrosis, focal	1 (2%)		
Ulcer	1 (2%)	1 (2%)	
Intestine small, ileum	(39)	(34)	(35)
Hyperplasia, lymphoid		1 (3%)	2 (6%)
Lymphatic, ectasia		1 (3%)	
Liver	(49)	(50)	(48)
Angiectasis, focal	1 (2%)		
Atrophy	1 (2%)		
Basophilic focus	18 (37%)	18 (36%)	19 (40%)
Clear cell focus	3 (6%)	7 (14%)	4 (8%)
Congestion		1 (2%)	
Degeneration, cystic	9 (18%)	17 (34%)	9 (19%)
Degeneration, diffuse			1 (2%)
Eosinophilic focus	2 (4%)	7 (14%)	7 (15%)
Fatty change	16 (33%)	14 (28%)	12 (25%)
Fibrosis	1 (2%)		
Hematocyst		1 (2%)	
Hyperplasia, focal			1 (2%)
Inflammation, granulomatous, focal	3 (6%)	1 (2%)	
Inflammation, necrotizing, focal			1 (2%)
Necrosis, focal	3 (6%)		1 (2%)
Thrombosis	1 (2%)		
Bile duct, hyperplasia	39 (80%)	46 (92%)	44 (92%)

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## Lesions in Male Rats

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TABLE A4

Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Alimentary System (continued)</b>			
Liver (continued)			
Centrilobular, atrophy	9 (18%)	4 (8%)	7 (15%)
Centrilobular, degeneration	8 (16%)	12 (24%)	9 (19%)
Centrilobular, degeneration, fatty			1 (2%)
Centrilobular, necrosis	5 (10%)		2 (4%)
Mesentery	(2)		(1)
Inflammation			1 (100%)
Pancreas	(48)	(46)	(47)
Lobules, atrophy	11 (23%)	7 (15%)	8 (17%)
Salivary glands	(49)	(50)	(50)
Inflammation	1 (2%)		
Necrosis			1 (2%)
Stomach, forestomach	(49)	(47)	(47)
Hyperkeratosis			1 (2%)
Inflammation	1 (2%)		
Mineralization	1 (2%)	4 (9%)	1 (2%)
Ulcer	5 (10%)	5 (11%)	8 (17%)
Stomach, glandular	(49)	(47)	(47)
Mineralization	6 (12%)	6 (13%)	6 (13%)
Ulcer	3 (6%)	3 (6%)	2 (4%)
<b>Cardiovascular System</b>			
Blood vessel	(4)	(5)	(5)
Aorta, mineralization	3 (75%)	5 (100%)	4 (80%)
Mesenteric artery, aneurysm			2 (40%)
Mesenteric artery, inflammation			1 (20%)
Mesenteric artery, mineralization	3 (75%)	5 (100%)	3 (60%)
Mesenteric artery, thrombosis	1 (25%)	1 (20%)	1 (20%)
Heart	(49)	(50)	(50)
Cardiomyopathy	42 (86%)	47 (94%)	50 (100%)
Atrium, thrombosis	9 (18%)	5 (10%)	11 (22%)
Epicardium, hyperplasia	1 (2%)		
Myocardium, inflammation		1 (2%)	
Myocardium, mineralization	2 (4%)	6 (12%)	5 (10%)
<b>Endocrine System</b>			
Adrenal gland, cortex	(49)	(49)	(48)
Degeneration	1 (2%)		
Degeneration, fatty	8 (16%)		2 (4%)
Degeneration, focal	1 (2%)		
Hyperplasia, diffuse			2 (4%)
Hyperplasia, focal	11 (22%)	4 (8%)	9 (19%)
Necrosis, focal	1 (2%)		
Adrenal gland, medulla	(49)	(48)	(47)
Hyperplasia	19 (39%)	8 (17%)	8 (17%)
Bilateral, hyperplasia	1 (2%)		1 (2%)
Islets, pancreatic	(47)	(41)	(43)
Hyperplasia			1 (2%)
Parathyroid gland	(45)	(45)	(46)
Hyperplasia	6 (13%)	11 (24%)	12 (26%)
Bilateral, hyperplasia	1 (2%)		

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**TABLE A4**  
**Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the Lifetime Inhalation Study of Talc (continued)**

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Endocrine System (continued)</b>			
Pituitary gland	(47)	(50)	(49)
Angiectasis, focal		1 (2%)	
Cyst		1 (2%)	1 (2%)
Pars distalis, hyperplasia	8 (17%)	8 (16%)	7 (14%)
Pars nervosa, hyperplasia		1 (2%)	
Thyroid gland	(45)	(46)	(46)
C-cell, hyperplasia	5 (11%)	7 (15%)	2 (4%)
<b>General Body System</b>			
None			
<b>Genital System</b>			
Epididymis	(49)	(50)	(49)
Spermatocele		1 (2%)	
Preputial gland	(48)	(49)	(48)
Hyperplasia	3 (6%)		1 (2%)
Inflammation	7 (15%)	2 (4%)	5 (10%)
Prostate	(49)	(45)	(48)
Atrophy	1 (2%)		1 (2%)
Inflammation	22 (45%)	14 (31%)	19 (40%)
Seminal vesicle	(49)	(48)	(47)
Atrophy	1 (2%)		
Inflammation	1 (2%)		
Testes	(49)	(50)	(50)
Atrophy	14 (29%)	11 (22%)	16 (32%)
Hyperplasia, lymphoid		2 (4%)	
Hyperplasia, lymphoid, focal			1 (2%)
Interstitial cell, hyperplasia	2 (4%)	1 (2%)	3 (6%)
Serosa, proliferation			1 (2%)
<b>Hematopoietic System</b>			
Bone marrow	(48)	(48)	(47)
Atrophy			2 (4%)
Atrophy, focal		1 (2%)	
Inflammation		1 (2%)	
Myelofibrosis		1 (2%)	1 (2%)
Myeloid cell, hyperplasia	2 (4%)	3 (6%)	6 (13%)
Lymph node	(49)	(50)	(50)
Hemorrhage, chronic		1 (2%)	
Pancreatic, atrophy	1 (2%)		
Pancreatic, hyperplasia, lymphoid	1 (2%)		
Lymph node, bronchial	(41)	(48)	(49)
Atrophy	2 (5%)		
Hemorrhage		1 (2%)	
Hemorrhage, acute	1 (2%)		
Hemorrhage, chronic	4 (10%)		
Hyperplasia, histiocytic		44 (92%)	46 (94%)
Lymph node, mandibular	(46)	(48)	(47)
Hemorrhage		1 (2%)	
Hyperplasia, lymphoid		2 (4%)	
Hyperplasia, plasma cell		2 (4%)	5 (11%)
Inflammation, chronic active			2 (4%)

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## Lesions in Male Rats

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**TABLE A4**  
**Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the Lifetime Inhalation Study of Talc (continued)**

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Hematopoietic System (continued)</b>			
Lymph node, mediastinal	(48)	(49)	(47)
Atrophy	1 (2%)		
Hemorrhage		3 (6%)	
Hemorrhage, acute	1 (2%)		
Hemorrhage, chronic	6 (13%)		
Hyperplasia, histiocytic		40 (82%)	43 (91%)
Pigmentation, hemosiderin	1 (2%)		
Lymph node, mesenteric	(49)	(48)	(47)
Atrophy	1 (2%)		
Hemorrhage		2 (4%)	
Hemorrhage, acute	1 (2%)		
Hyperplasia, lymphoid	1 (2%)	2 (4%)	3 (6%)
Hyperplasia, plasma cell			1 (2%)
Inflammation, chronic active			1 (2%)
Spleen	(49)	(50)	(48)
Atrophy	1 (2%)		2 (4%)
Autolysis			1 (2%)
Congestion, chronic	1 (2%)		
Cyst			1 (2%)
Fibrosis		1 (2%)	
Fibrosis, focal		5 (10%)	2 (4%)
Hematopoietic cell proliferation	1 (2%)	2 (4%)	3 (6%)
Hyperplasia, histiocytic		1 (2%)	
Hyperplasia, lymphoid		1 (2%)	1 (2%)
Infarct	3 (6%)		
Inflammation, granulomatous, focal	1 (2%)		1 (2%)
Thymus	(48)	(40)	(43)
Atrophy		2 (5%)	
Cyst	1 (2%)		
<b>Integumentary System</b>			
Mammary gland	(45)	(48)	(50)
Galactocele	1 (2%)		
Skin	(48)	(50)	(50)
Cyst epithelial inclusion		1 (2%)	
Subcutaneous tissue, inflammation			1 (2%)
Tail, necrosis	1 (2%)		
<b>Musculoskeletal System</b>			
Bone	(49)	(50)	(50)
Fibrous osteodystrophy	3 (6%)	4 (8%)	5 (10%)
Coccygeal, necrosis	1 (2%)		
Pelvis, fracture		1 (2%)	
<b>Nervous System</b>			
Brain	(49)	(50)	(50)
Compression	5 (10%)	2 (4%)	2 (4%)
Hemorrhage		1 (2%)	
Infarct			1 (2%)
Necrosis, focal	1 (2%)	2 (4%)	
Spinal cord			(1)
Degeneration			1 (100%)

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TABLE A4

Summary of the Incidence of Nonneoplastic Lesions in Male Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Respiratory System</b>			
Larynx	(48)	(49)	(49)
Inflammation, suppurative	6 (13%)		
Lung	(49)	(50)	(50)
Congestion	1 (2%)		
Crystals, focal	1 (2%)		
Cyst			3 (6%)
Hemorrhage, chronic	2 (4%)		
Infarct	1 (2%)		
Inflammation, granulomatous	2 (4%)	50 (100%)	49 (98%)
Inflammation, suppurative		2 (4%)	
Mineralization		4 (8%)	
Alveolar epithelium, hyperplasia	5 (10%)	26 (52%)	38 (76%)
Alveolus, hemorrhage, focal	1 (2%)		
Alveolus, metaplasia, squamous			2 (4%)
Artery, thrombosis	1 (2%)		
Interstitial, fibrosis, focal	1 (2%)	16 (32%)	33 (66%)
Interstitial, mineralization	2 (4%)	1 (2%)	4 (8%)
Peribronchial, hyperplasia, histiocytic		12 (24%)	8 (16%)
Nose	(49)	(48)	(47)
Inflammation, suppurative	2 (4%)	1 (2%)	
Lumen, foreign body	1 (2%)		
Lumen, hemorrhage			1 (2%)
Mucosa, inflammation, suppurative	4 (8%)	5 (10%)	2 (4%)
Nasolacrimal duct, inflammation, suppurative		1 (2%)	
Respiratory epithelium, hyperplasia		3 (6%)	14 (30%)
Trachea	(49)	(50)	(48)
Inflammation, suppurative	3 (6%)		1 (2%)
<b>Special Senses System</b>			
Eye	(3)	(2)	(2)
Cataract	1 (33%)	1 (50%)	2 (100%)
Inflammation, chronic			1 (50%)
Cornea, inflammation, necrotizing			1 (50%)
Cornea, necrosis	1 (33%)		
Lens, cataract	1 (33%)		
Retina, degeneration	2 (67%)	1 (50%)	1 (50%)
<b>Urinary System</b>			
Kidney	(49)	(49)	(48)
Calculus micro observation only			1 (2%)
Cyst	3 (6%)		1 (2%)
Hydronephrosis		1 (2%)	1 (2%)
Nephropathy	45 (92%)	47 (96%)	43 (90%)
Medulla, inflammation		1 (2%)	1 (2%)
Renal tubule, necrosis		1 (2%)	
Ureter			(1)
Calculus micro observation only			1 (100%)
Urethra			(1)
Fibrosis			1 (100%)
Urinary bladder	(49)	(48)	(47)
Calculus gross observation			1 (2%)
Inflammation	1 (2%)		
Mucosa, hyperplasia			1 (2%)

<sup>a</sup> Incidences are expressed as the ratio of animals with lesions to the number of animals examined microscopically at the site.

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## **APPENDIX B SUMMARY OF LESIONS IN FEMALE RATS IN THE LIFETIME INHALATION STUDY OF TALC**

<b>TABLE B1</b>	<b>Summary of the Incidence of Neoplasms in Female Rats in the Lifetime Inhalation Study of Talc .....</b>	<b>B-2</b>
<b>TABLE B2</b>	<b>Individual Animal Tumor Pathology of Female Rats in the Lifetime Inhalation Study of Talc .....</b>	<b>B-6</b>
<b>TABLE B3</b>	<b>Statistical Analysis of Primary Neoplasms in Female Rats in the Lifetime Inhalation Study of Talc .....</b>	<b>B-24</b>
<b>TABLE B4</b>	<b>Summary of the Incidence of Nonneoplastic Lesions in Female Rats in the Lifetime Inhalation Study of Talc .....</b>	<b>B-29</b>

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B-2

Talc, NTP TR 421

**TABLE B1**  
**Summary of the Incidence of Neoplasms in Female Rats in the Lifetime Inhalation Study of Talc<sup>a</sup>**

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Disposition Summary</b>			
Animals initially in study	50	50	50
Early deaths			
Moribund	28	17	27
Natural deaths	11	19	14
Survivors			
Terminal sacrifice	11	13	9
Missing		1	
Animals examined microscopically	50	49	50
<b>Alimentary System</b>			
Intestine small, ileum	(44)	(32)	(38)
Liver	(50)	(48)	(50)
Granulosa-theca tumor malignant, metastatic, ovary			1 (2%)
Hepatocellular carcinoma		1 (2%)	
Neoplastic nodule		3 (6%)	1 (2%)
Pancreas	(50)	(46)	(49)
Pharynx			(1)
Squamous cell carcinoma			1 (100%)
Salivary glands	(50)	(48)	(50)
Fibrosarcoma			1 (2%)
Sarcoma		1 (2%)	
Stomach, forestomach	(50)	(45)	(49)
Stomach, glandular	(50)	(47)	(50)
Tongue		(2)	
Sarcoma, metastatic		1 (50%)	
Squamous cell papilloma		1 (50%)	
Tooth		(1)	
Adamantinoma benign		1 (100%)	
<b>Cardiovascular System</b>			
Heart	(50)	(48)	(50)
Granulosa-theca tumor malignant, metastatic, ovary			1 (2%)
<b>Endocrine System</b>			
Adrenal gland, cortex	(50)	(47)	(49)
Granulosa-theca tumor malignant, metastatic, ovary			1 (2%)
Adrenal gland, medulla	(48)	(47)	(49)
Granulosa-theca tumor malignant, metastatic, ovary			1 (2%)
Pheochromocytoma malignant		1 (2%)	7 (14%)
Pheochromocytoma benign	13 (27%)	10 (21%)	11 (22%)
Bilateral, pheochromocytoma malignant			3 (6%)
Bilateral, pheochromocytoma benign		4 (9%)	7 (14%)
Islets, pancreatic	(50)	(45)	(49)
Adenoma	1 (2%)	1 (2%)	1 (2%)
Parathyroid gland	(43)	(42)	(47)
Pituitary gland	(50)	(47)	(50)
Pars distalis, adenoma	19 (38%)	18 (38%)	21 (42%)
Pars distalis, carcinoma	3 (6%)	3 (6%)	2 (4%)

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## Lesions in Female Rats

B-3

**TABLE B1**  
**Summary of the Incidence of Neoplasms in Female Rats in the Lifetime Inhalation Study of Talc (continued)**

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Endocrine System (continued)</b>			
Thyroid gland	(50)	(47)	(49)
Bilateral, C-cell, carcinoma	1 (2%)		
C-cell, adenoma	5 (10%)		6 (12%)
C-cell, carcinoma	2 (4%)	2 (4%)	2 (4%)
Follicular cell, adenoma		1 (2%)	
<b>General Body System</b>			
None			
<b>Genital System</b>			
Clitoral gland	(47)	(44)	(46)
Adenoma			1 (2%)
Carcinoma	2 (4%)		1 (2%)
Ovary	(50)	(47)	(50)
Granulosa cell tumor malignant	1 (2%)		
Granulosa cell tumor benign		2 (4%)	
Granulosa-theca tumor benign		1 (2%)	
Bilateral, granulosa-theca tumor malignant			1 (2%)
Uterus	(50)	(48)	(50)
Polyp stromal	5 (10%)	7 (15%)	4 (8%)
Sarcoma stromal		1 (2%)	
<b>Hematopoietic System</b>			
Bone marrow	(50)	(43)	(49)
Lymph node	(50)	(48)	(50)
Lymph node, bronchial	(46)	(47)	(47)
Adenocarcinoma, metastatic, thyroid gland	1 (2%)		
Squamous cell carcinoma, metastatic, lung			1 (2%)
Lymph node, mandibular	(47)	(46)	(47)
Sarcoma, metastatic		1 (2%)	
Lymph node, mediastinal	(47)	(44)	(47)
Adenocarcinoma, metastatic, thyroid gland	1 (2%)		
Carcinoma, metastatic, uncertain primary site			1 (2%)
Fibrosarcoma, metastatic, skin			1 (2%)
Granulosa-theca tumor malignant, metastatic, ovary			1 (2%)
Lymph node, mesenteric	(49)	(47)	(47)
Spleen	(50)	(48)	(50)
Thymus	(47)	(44)	(47)
Mixed tumor malignant		1 (2%)	
Myxoma		1 (2%)	
Schwannoma benign			1 (2%)
Thymoma benign	1 (2%)		
<b>Integumentary System</b>			
Mammary gland	(50)	(48)	(50)
Adenocarcinoma	2 (4%)		2 (4%)
Adenoma	1 (2%)	2 (4%)	2 (4%)
Fibroadenoma	11 (22%)	10 (21%)	13 (26%)
Fibroma	1 (2%)	1 (2%)	
Fibrosarcoma			1 (2%)

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B-4

Talc, NTP TR 421

**TABLE B1**  
**Summary of the Incidence of Neoplasms in Female Rats in the Lifetime Inhalation Study of Talc (continued)**

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Integumentary System (continued)</b>			
<b>Skin</b>	(50)	(49)	(50)
Keratoacanthoma		1 (2%)	1 (2%)
Subcutaneous tissue, fibrosarcoma		1 (2%)	1 (2%)
<b>Musculoskeletal System</b>			
<b>Bone</b>	(50)	(48)	(50)
Mandible, sarcoma	1 (2%)		
Mandible, sarcoma, metastatic		1 (2%)	
<b>Skeletal muscle</b>	(1)	(1)	
Liposarcoma		1 (100%)	
<b>Nervous System</b>			
<b>Brain</b>	(50)	(48)	(50)
Astrocytoma benign	1 (2%)		
Carcinoma, metastatic, pituitary gland	2 (4%)	1 (2%)	1 (2%)
Ependymoma malignant	1 (2%)		
<b>Respiratory System</b>			
<b>Larynx</b>	(50)	(48)	(48)
Adenocarcinoma, metastatic, thyroid gland	1 (2%)		
<b>Lung</b>	(50)	(48)	(50)
Adenocarcinoma, metastatic, multiple, mammary gland	1 (2%)		
Alveolar/bronchiolar adenoma	1 (2%)		8 (16%)
Alveolar/bronchiolar adenoma, multiple			1 (2%)
Alveolar/bronchiolar carcinoma			4 (8%)
Alveolar/bronchiolar carcinoma, multiple			1 (2%)
Granulosa-theca tumor malignant, metastatic, ovary			1 (2%)
Squamous cell carcinoma			1 (2%)
<b>Special Senses System</b>			
None			
<b>Urinary System</b>			
<b>Kidney</b>	(49)	(47)	(49)
Lipoma		1 (2%)	
<b>Urinary bladder</b>	(50)	(45)	(50)
<b>Systemic Lesions</b>			
<b>Multiple organs<sup>b</sup></b>	(50)	(49)	(50)
Leukemia mononuclear	13 (26%)	20 (41%)	18 (36%)
Lymphoma malignant lymphocytic		2 (4%)	
Lymphoma malignant mixed		1 (2%)	

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## Lesions in Female Rats

B-5

TABLE B1

Summary of the Incidence of Neoplasms in Female Rats in the Lifetime Inhalation Study of Talc (continued)

	0 mg/m <sup>3</sup>	6 mg/m <sup>3</sup>	18 mg/m <sup>3</sup>
<b>Tumor Summary</b>			
Total animals with primary neoplasms <sup>c</sup>	44	47	49
Total primary neoplasms	85	100	124
Total animals with benign neoplasms	38	35	39
Total benign neoplasms	59	65	78
Total animals with malignant neoplasms	23	31	35
Total malignant neoplasms	26	35	46
Total animals with metastatic neoplasms	4	3	4
Total metastatic neoplasms	6	8	10
Total animals with malignant neoplasms, uncertain primary site			1

<sup>a</sup> Incidences are expressed as the ratio of animals with lesions to the number of animals examined microscopically at the site.<sup>b</sup> Number of animals with any tissue examined microscopically<sup>c</sup> Primary tumors: all tumors except metastatic tumors

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